

CHAPTER 900 LANDSCAPE ARCHITECTURE

Topic 901 - General

Index 901.1 - Office of State Landscape Architecture

The Office of State Landscape Architecture is responsible for the development of policies, programs, procedures, and standards for all aspects of the Roadside Rehabilitation Program which consists of Highway Planting, Safety Roadside Rest Area, Roadside Enhancement, Roadside Management, Beautification and Modernization, Scenic Highway, Transportation Enhancement Activities (TEA), Transportation Art, and Blue Star Memorial Highway programs and planting in conjunction with Noise Abatement Features.

This chapter provides mandatory, advisory and permissive standards as defined in Index 82.1. The Division of Design is responsible for approving exceptions to all mandatory standards (**Boldface** type) and the District Directors are responsible for approving exceptions to all advisory standards (indicated by Underlining) as discussed in Index 82.2. All other guidance in this Chapter pertaining to the design of planting and irrigation systems is the responsibility of the Office of State Landscape Architecture. Exceptions to this guidance may be permitted with the approval of the Office of State Landscape Architecture District Coordinator.

901.2 Cross References

Several highway landscape architectural terms are defined in Index 62.5 of this manual.

The Project Development Procedures Manual contains general definitions, policies, and procedures concerning planting and conservation of vegetation and explains procedures and responsibilities for developing highway planting projects. The manual also includes guidelines for the Blue Star Memorial Highway and Transportation Art programs.

The Roadside Vegetation Management Handbook provides reference information on the design, installation, and management of Caltrans' roadside vegetation.

The Environmental Handbook contains guidelines and responsibilities for determining scenic resources during the project development process.

The Encroachment Permits Manual contains procedures and guidelines for planting design and administering planting by others, through permits.

The Construction Manual discusses materials and methods involved in planting and irrigation. It describes allowable options for materials and work methods called for in the project specifications.

The Maintenance Manual contains instructions about the maintenance of roadside vegetation and other roadside features.

The Landscape Architecture Project Plan Standards booklet provides guidelines for the preparation of highway planting plans.

The Plant Setback and Spacing Guide contains minimum plant spacing and distances from various elements within the highway right of way.

The California Native Wildflower Checklist is a reference list of native species to assist designers in selecting plants to conform to Federal wildflower requirements.

The Water Conservation Deputy Directive (DD-13) explains the Department's policy and provides guidelines for the use of both potable and nonpotable water.

Topic 902 - Highway Planting Standards and Guidelines

902.1 General

This section provides standards and guidelines for the design of planting and irrigation systems.

Highway planting is vegetation placed for aesthetic, safety, environmental mitigation, storm water pollution prevention, or erosion control purposes, and includes necessary irrigation systems, inert materials, mulches, Design For Safety features and appurtenances.

In addition, highway planting is used to satisfy the need for headlight glare reduction, fire retardance, windbreak protection, or graffiti reduction on retaining walls and noise barriers.

(1) *Design Considerations.* Planting and irrigation systems should be designed to achieve a balance between aesthetics, safety, maintainability, cost-effectiveness, and resource conservation. Plantings should be responsive to local community goals.

- (a) *Aesthetics.* Highway planting and replacement planting shall integrate the facility with the adjacent community or natural surroundings; buffer objectionable views of the highway facility for adjacent homes, schools, parks, etc.; soften visual impacts of large structures or graded slopes; screen objectionable or distracting views; frame or enhance good views; and provide visually attractive interchanges as entrances to communities.

Materials and planting compositions should be visually compatible with local indigenous plant communities or surrounding landscape planting.

Plantings should be designed according to the perspective of the viewer. For example, compositions viewed by freeway motorists should be simplified and large scale. Plantings viewed primarily by pedestrians may be designed with greater detail.

Contour grading, with careful preservation and enhancement of existing plants and natural features should be integrated into the overall composition.

- (b) *Safety.* Planting and irrigation facilities shall be designed to ensure the safety of both maintenance personnel and the public.

To understand potential hazards to maintenance personnel, designers should be familiar with Chapter 8, "Protection of Workers", of the Maintenance Manual.

Selection and location of plants shall be carefully considered to maintain sight distance and clear recovery zone setbacks. Planting shall not interfere with the function of safety features such as shoulders, barriers, guardrail, traffic or regulatory, warning and guide signs nor with motorists' view of the road.

Irrigation components shall be clustered and located adjacent to access gates, maintenance vehicle pullouts, maintenance access roads or other areas away from traffic.

Highway planting projects, including highway planting restoration, shall incorporate safety concepts that include, but are not limited to, the following:

- *Access* - Provide access gates for maintenance personnel from local streets and frontage roads. Provide paved maintenance vehicle pullout areas away from traffic on high volume highways and other areas where access cannot be made from local streets and roads. Maintenance access roads provide access to the center of loop areas or other wide, flat areas.
- *Minimize Exposure to Traffic and Reduce the need for Lane Closures* - Locate irrigation system components and, vegetation away from shoulder areas, gore areas, narrow island areas between ramps and traveled way to reduce the need for lane closures, pruning or other maintenance operations. Place irrigation components that require regular maintenance, such as controllers, behind safety devices. Narrow areas and gore areas should be paved where possible.
- *Automated Irrigation* - Use automated irrigation systems and remote control devices to minimize worker exposure and allow for effective water management. Valves should be clustered and be placed adjacent to maintenance

vehicle pullouts or made accessible from the right of way.

- Median Planting - Median planting is generally not permitted. Exceptions for the planting of medians can be approved by the District Director if the planting can be safely maintained.
- (c) Maintainability. Maintenance-intensive activities should be identified and minimized by design. These activities can be determined through field observation and discussions with maintenance personnel during project development. Ongoing communication between designers, landscape specialists, landscape maintenance personnel, and construction inspectors is required to ensure that maintenance concerns are addressed.
- Planting and irrigation design shall reflect the goal of reduced pesticide use.
- Adequate plant establishment and irrigation test periods shall be provided.
- (d) Cost-effectiveness. The design should provide maximum benefit for the long term costs involved. Materials and methods specified should be commercial quality and closely matched to the project conditions.
- (e) Resource Conservation. Conservation measures such as the use of appropriate plants, mulches, nonpotable water, automated irrigation systems, remote irrigation control systems (RICS), and moisture sensors will help achieve this requirement.

Highway planting should be able to withstand roadside conditions and become established on limited water with minimal maintenance. Planting designs shall account for life cycle costs including the availability of resources for maintenance.

Trees and vegetation shall be preserved and protected to the maximum extent feasible during the planning, design and construction of transportation projects.

Native species are encouraged throughout the transportation system, where appropriate. Section 130 of the Surface Transportation and Uniform Relocation Act requires at least one quarter of one percent of funds expended for a landscaping project on the Federal Aid System be used to plant native wildflowers. Additional information can be found in the FHWA manual "Roadside Use of Native Plants."

902.2 Sight Distance and Clear Recovery Zone Standards

Sight distance and safety are of primary importance, and shall not be subordinated to aesthetics. Applicable minimum horizontal and vertical sight distance standards are set forth in Topic 201, Sight Distance.

Two types of safety setbacks affect the placement of landscape elements:

- To keep the continuous length of highway ahead visible to the driver (sight distance).
 - To keep the clear recovery zone free of physical obstructions.
- (1) *Sight Distance Setbacks.* Sight distance limits are measured from the edge of traveled way to the outside edge of the mature growth. Care shall be taken to ensure that future growth will not obstruct sight distance.

Proposed planting should maintain horizontal and vertical sight distance required by the design speed of the facility. In cases where, due to geometric restrictions, the existing facility does not provide 130 km/h sight distance, no further reduction should be caused by planting.

For Interchanges, all planting shall provide ramp and collector-distributor road sight distance equal to or greater than that required by the design speed criteria with a minimum provision of sight_distance for 60 km/h. At points within an interchange area where ramp connections or channelization are provided, plantings shall be clear of the shoulders and sight line shown in Figure 504.3J, Location of Ramp Intersections on the Crossroad.

Particular attention should be paid to planting on the inside of curves, in interchange loops, in median areas, on the ends of ramps, and on cut slopes so that shoulders are clear and designed sight distances are retained.

Sight distance setbacks restrict the height of plants or the horizontal distance of plants from the traveled way. Low growing plants may be placed in front of the setbacks as long as the requirements for sight distance are met as discussed in Index 201.6 and illustrated in Figure 201.6. Taller growing plants shall be placed beyond these setbacks. In interchange areas, generally, from the edge of traveled way, a 15 m setback within the loops is considered as the sight distance setback for trees and shrubs that will grow above a 0.5 m height.

- (2) *Clear Recovery Zone.* Recovery zone setbacks provide areas for errant vehicles to regain control. The policy along freeways and expressways, including interchange areas, should be to strive for 12 m or more of clearance between the edge of traveled way and large trees, but with a minimum clearance of 9 m. Special considerations should be given to providing additional clearance in potential recovery areas. The 9-meter distance is measured horizontally to the trunk of the tree. Large trees may be planted within the 9-meter limit where they will not constitute a fixed object; for example, on cut slopes above a retaining wall or in areas behind guardrail which has been placed for reasons other than the tree planting.

For setback purposes, large trees are defined as plants which at maturity, or within 10 years, have trunks 100 mm or greater in diameter, measured 1.2 m above the ground. Small trees are those with smaller trunks or plants usually considered shrubs, but trained in tree form which would not develop 100 mm diameter trunks within 10 years. Examples of small trees are Western Redbud (*Cercis occidentalis*), Crape Myrtle (*Lagerstroemia indica*), Bottle Brush (*Callistemon* sp.), and Oleander (*Nerium oleander*).

Exceptions to the 9-meter setback may also be considered on cut slopes which are 1:2 or steeper and where ground cover will be placed on the slopes and the trees cannot be offset at least 9 m due to right of way restrictions or physical restrictions such as retaining walls. The minimum setback in these cases should be 7.5 m.

Offset distances greater than 9 m should be provided at locations such as on the outside of horizontal curves, near ramp gores, at points of congestion, or where evasive maneuvers may be required.

Large trees should not be planted in unprotected areas of freeway or expressway medians with the possible exception of separated roadways with medians of sufficient width to meet the setback requirements for tree planting.

902.3 Planting Guidelines

- (1) *Design Procedures.* An overview of the design process is covered in the Project Development Procedures Manual.
- (2) *Plant Selection.* Plants should be tolerant of local environmental conditions such as temperature, soil, water quality, air quality, wind and have proven to be durable adjacent to highways and in transportation facilities. California native plants should be incorporated into the design, taking into account local plant communities and species availability, to the maximum extent feasible.

Plants should have the proper growth rate, longevity, size, and appearance for their intended uses. Wherever feasible, trees should be used to create the main structure of the planting composition. Plants should not require regular, ongoing maintenance.

A diversity of plant material should be chosen. Monoculture planting is discouraged.

Only plants which will have the greatest chance of survival if water were to become unavailable should be selected. Species must be suitable for the project site. If plant tolerances are questionable, the species

should be avoided or used on a limited experimental basis.

Trees generally recognized to be brittle, susceptible to disease, or that increase in size by suckering, should not be selected.

Plants with edible or attractive fruits, berries or nuts should not be selected.

When appropriate, all new and replacement planting projects must include California native wildflowers as an integral and permanent part of the planting design. The Project Development Procedures Manual discusses wildflower requirements.

- (3) *Plant Location.* When locating plants, the mature size, form, and characteristics of the species shall be considered, particularly for safety of maintenance workers and the traveling public, and long term maintenance costs.

Plants should be located so that pruning will not be required. Trees must not be planted under overhead utilities or structures.

Plants should be located so that they will not obscure existing billboards, or on-premise business identification signs.

Plants with similar water requirements should be grouped for irrigation purposes.

Plants with thorns or known to be poisonous to humans and animals, (e.g., Rose, Oleander), should not be planted adjacent to areas used for grazing animals, equestrian activities, with high public exposure, and where children have access to the planting. Designers should be aware of State and local restrictions on the planting of certain species in or adjacent to specified areas.

In areas subject to frost and snow, plantings should not be located where they will cast shade and create patches of ice on vehicle or pedestrian ways.

- (4) *Trees Planted Along Conventional Highways.* Safety, sight distance standards, environmental needs and maintainability are the primary concerns when establishing the

locations for tree planting on conventional highways.

A minimum height clearance of 4.6 m from the pavement to the lower foliage of overhanging branches is necessary to provide for the passage of trucks. The size, shape, and maturity of the tree should be considered when trimming is necessary to maintain vertical clearances. Trees which will ultimately become very wide are undesirable if their maintenance will cause interference with traffic flow.

See the Encroachment Permits Manual for further information on trees.

Large trees that at maturity (10 years) will have a trunk 100 mm or greater in diameter (measured 1.2 m above the ground) are not permitted unless all of the following conditions are met:

- The existing speed zone is 56.3 km/hr (35 mph or less).
- There is a curb or barrier between the traveled way and the trees.
- The sight distance is not restricted.
- Existing signs and signals are not visually restricted.
- In a median the trees are at least 1.8 m from the face of curb.
- Trees are at least 30.4 m from the end of any median strip and at least 6 m from any manholes.

If all the above conditions are not met, the locations of large trees must provide a minimum of 9 m clearance from the edge of traveled way.

- (5) *Planting of Walls.* Vine planting should be included with all sound barrier projects to reduce the potential for graffiti and to soften the appearance of the wall. If retaining walls or sound barriers are located within the clear recovery zone (see Index 902.2), plants may be placed behind the walls and be allowed to grow over (or through) the wall, or plants may be placed in front of the wall, but they must

be behind a concrete safety shaped barrier. Plants are not permitted on concrete safety shaped barriers on the traffic side, unless an exception is granted from the Division of Traffic Operations and all of the following requirements are met:

- (a) Only vines which have a natural tendency to cling to noise barriers or retaining walls may be planted on the traffic side of barriers. Support structures on walls should not be used. The vines must readily adhere to the barriers. No shrubs or ground cover will be allowed. Vines such as Creeping Fig (*Ficus pumila*) and Algerian Ivy (*Hedera canariensis*) will not be allowed due to their habit of peeling off hard surfaces at maturity.
- (b) Plant basins must be depressed and minimal in size. Ground surface irregularities must be insignificant or nonexistent.
- (c) Each plant must be individually irrigated. The Maintenance Unit should be consulted when a wall is to be planted. The plants should not encroach onto the shoulder or create sight distance problems.
- (6) *Planting of Vines on Bridges* – Vines should not be planted where they might grow over any portion of the bridge structure. When the regular inspection of bridges and special structures is required and where rapid visual inspection of these structures is required in areas of high seismic activity, the planting of vines on bridges is not permitted. There are certain conditions such as low average daily traffic, high redundancy in the substructure, etc. where exceptions from Bridge Maintenance may be granted, after all risk vs. benefit factors are considered, to plant vines.

902.4 Irrigation Guidelines

- (1) *General.* Irrigation systems and components shall be designed to conserve water, minimize maintenance, minimize worker exposure to traffic, and sustain the planting. The design should be simple, efficient, and straightforward. Irrigation concepts utilized should conform to local water conservation goals.

Whenever available, water sources should be nonpotable, e.g., reclaimed or untreated water sources, consistent with quality and health standards, and the cost should be justified (see the Project Development Procedures Manual for cost guidelines). Water quality should be considered when selecting components and designing the system.

Standard, commercially available irrigation components should be used and special features should not be specified unless they are required to solve unique problems of the site.

Security measures, such as locking cabinets, enclosures and valve boxes should be provided.

Potential damage from pedestrians or vehicles should be considered when selecting and locating all irrigation components. Irrigation components shall be placed away from gores, narrow areas, decision points, etc.

- (2) *Valves and Sprinklers.* Irrigation systems should be designed for automatic operation. When systems are temporary or will be used infrequently, manual, battery, solar or timer-operated valves may be used.

Control valves shall be manifolded where practical and a ball valve shall be provided.

When appropriate, trees and shrubs, spaced more than 3 m on center, shall be individually watered.

Overhead irrigation systems, e.g., impact or gear driven sprinklers, should be primarily used for irrigating low shrub masses, ground cover and establishing native grasses. Trees in overhead irrigated ground cover areas will receive supplemental basin water. Sprinklers should be appropriate for local wind and soil conditions. Sprinklers adjacent to the roadway should be selected and placed to avoid spray on the roadway. Sprinklers, other than pop-up, subject to being driven over should be provided with flexible risers or flow shutoff devices. Sprinkler protectors should be used on pop-up sprinklers and quick coupling valves adjacent to pavement.

- (3) *Controllers.* Irrigation controllers shall be easily accessible, located in enclosures, protected from vehicular traffic, and in an area with good lighting and visibility to oncoming traffic. Controllers shall not be located near shoulders, in or near dense shrubbery, or in the path of the spray of sprinklers.
- (4) *Backflow Preventers.* The use of reduced pressure principle backflow devices are required for highway planting projects. Master remote control valves should be used at all pressured water sources directly downstream of the backflow preventers. Backflow preventers will be located in enclosures.
- (5) *Booster Pump Systems.* When local agency water pressure is insufficient, design of a booster pump system will be requested of DES-SD, Office of Electrical, Mechanical, Water and Wastewater Engineering (OEMW&W). After the irrigation circuit system has been designed such that all branches have close to equal flowrate requirements, the booster pump system design request will include the flowrate and discharge pressure needed for the pump, the availability for power distribution, and maintenance access to the pump site. OEMW&W will design the booster pump system, including the equipment pad, enclosure, valves and piping, pump equipment, and pump control equipment.

Topic 903 - Safety Roadside Rest Area Standards and Guidelines

903.1 Minimum Standards

The following standards generally represent minimum values. However, safety roadside rest area policies and standards are not inflexible. When in line with sound judgment, systems considerations and other valid concerns, variations may be considered. To promote uniform practice on a statewide basis, standards lower than indicated herein may not be used without approval from the Chief of the Office of State Landscape

Architecture. The Division of Design is responsible for approving nonstandard geometric design standards as discussed in Topic 82 and Index 901.1. The Design Reviewer and Coordinator should be involved in reviewing the geometric features for the design of the on and off ramps of safety roadside rest areas. Structural sections and drainage should be designed in accordance with Chapters 600 and 800.

903.2 General Notes

Safety roadside rest areas are to be constructed on State highway right of way or if at an interchange, 0.5 km maximum from a State highway. Ingress and egress to rest areas should be designed to the standards of the highway along which they are located as indicated in Index 107.1.

Safety roadside rest areas should be designed to be functional, safe for the user, and aesthetic, economical and easy to maintain. Structures and facilities should combine aesthetic principles with functional requirements both as individual units and as related elements in the overall site plan. A unity of design should be expressed in all elements of each facility regarding materials, texture, color, form, and scale. The site plan should be developed by the District Landscape Architect in collaboration with the Architect.

The design of architectural structures such as comfort stations, information display panels, picnic tables, picnic table shelters, utility structures, etc., will be done by Division of Engineering Services - Structure Design (DES-SD). The Architect in DES-SD is responsible for the development of all architectural features within the facility, including color and materials coordination. DES-SD is responsible for advising the Resident Construction Engineer to obtain the name of the paint manufacturer and paint color numbers and forwarding the information to District Maintenance for repairs.

Topographic features should be preserved. Existing trees and other vegetation should be preserved where appropriate. Views should be considered in the selection and development of the site. Provisions for expansion of the various facilities and circulation patterns should be considered. Safety roadside rest areas shall be

designed to be accessible to all travelers and conform to the current Americans with Disabilities Act.

903.3 Function

The Safety Roadside Rest Area System is intended to provide places where motorists may stop for short periods to rest and relax. Facilities must be accessible, clean, and attractive. The objective is to provide facilities which promote safe driving by encouraging the motorist to rest when tired.

903.4 Site Feasibility

Specific site selection should be made on a basis of the suitability of the site for development. For this determination, the following items must be considered and included in the Project Report:

- (1) *Availability of Utilities.* Water, sewage, telephone, and electric service are required for all rest areas. A source of potable water, commercial electric service, and telephone must be confirmed. The development of sewage and water systems must address State and local agency regulations.
- (2) *Topography.* The feasibility of construction on a specific site requires careful evaluation. This includes:
 - (a) Grade of slope and direction of slope of the general area.
 - (b) The history of flooding and grade relationship to high water line.
 - (c) The number, type, size, and condition of trees and shrubs on the site; the amount and kind of existing underbrush.
 - (d) Water courses, whether all-year or intermittent.
 - (e) Seismic data.
 - (f) Soil conditions, rock outcroppings, or underlying strata.
 - (g) Wind conditions.
 - (h) The surrounding environment. Rest area development should fit the site rather than attempting to change the site to fit a rest area.

- (3) *Safety.* Traffic ingress and egress in relation to the highway and nearest interchanges, etc., is a prime consideration in site location.

- (4) *Scenic Value.* Insofar as possible and practical, safety roadside rest areas should be constructed where a scenic view is available. This, however, is a secondary consideration following the practical and economic factors.

903.5 Facilities and Features

To provide functionally adequate safety roadside rest areas, the following facilities and features should be included.

- (1) *Size and Capacity.* The size and capacity of parking areas, sewage and water systems and restrooms is determined by 20-year traffic requirements. A design designation that expresses the basic factors which control the design of a rest area should be given in the Project Report and appear on the typical section of all rest area projects. The following is an example of this expression.

ADT (2000) = 500

ADT (2020) = 700

ADT - Peak Month (2020) = 1150

DHV (2020) = 130

Long Vehicles = 31%

Turnover = 3/Hour

Persons/Vehicle = 2.2

Definitions:

ADT (2000)--The average daily traffic for the current year using the rest area.

ADT (2020)--The average daily traffic for the design year.

ADT Peak Month--The average daily traffic for the peak month in the design year using the rest area. Instead of the peak month ADT, the average of six 3-day holiday weekends may be considered. This type of information is needed to ensure that an adequate water supply and sewage system is designed.

DHV--The design hourly volume of vehicles in the design year.

Long Vehicles--The percent of trucks and other vehicles which require long parking spaces.

Turnover--The average length of time a vehicle stays in the rest area (20 minutes) divided into 60 minutes. Round upward to highest whole number.

Persons/Vehicle--The national average number of persons in the vehicle is 2.2.

When feasible, the design should allow the parking area to be expanded by 25% beyond the 20-year design period. The master plans should indicate this future expansion.

Rest areas designed for freeways shall have standard freeway exit and entrance ramps (see Chapter 500). Projects to rehabilitate existing ramps and/or parking lots must address upgrading of ramps and geometrics to the current design standards. Rest areas on expressways and conventional highways should be designed with standard public road connections and median left turn lanes (see Topic 405).

Rest areas must not only be designed to accommodate the demand for parking spaces, but must have adequate water supply and a sewage system.

- (2) *Grading.* This is an important feature in making a rest area accessible, safe, functional, aesthetically pleasing, and economical. Certain concepts are necessary to ensure that the grading is properly designed to accomplish this. Generally, grading operations should be held to a minimum so as to disturb as little of a site as possible. Grading should be designed so that the slopes and grades developed follow the natural direction of slope of the area.

Cuts and fills close to existing trees to be saved should be avoided. When necessary, special treatment for the trees should be incorporated. The District Landscape Architect will recommend such treatment as

necessary in these cases. Cuts and fills should be shaped and rounded to conform to existing ground shapes. Grading should be done to ensure water flows away from walkways or is taken care of by drainage boxes.

Areas around buildings, shelters, and table slabs should be sloped away from the structure at an approximate 2% grade, but not less than 1% nor more than 3% on paved areas. Parking area slopes parallel to direction of parking should not exceed 2% in the truck area, nor 3% in the car area. For accessibility guidelines on grade and cross slopes, see Topic 105.3. Cross slopes in either case should not exceed 4%. When entrance ramps exceed a 6% grade, up or down, a transition area between the end of the ramp and the parking or other facility should be incorporated.

General area grading should be shown on plans by existing and proposed contour lines of not more than 0.5-meter vertical intervals. Pavement should be shown either by spot grades (existing and proposed) or by a combination of spot grades and contour lines. Profiles and sections should be shown when grading intent is not clear by plan indications only. Building finish floor grades and all pads for architectural elements should be individually defined by spot grades. Changes in grade should be done smoothly and gradually without abrupt edges or slopes.

- (3) *Roads and Parking.* Vehicular circulation must be simple, direct and obvious to the motorist. See Topic 403 for principles of channelization. The minimum distance between successive noses should be 180 m on exit ramps into rest areas. Vehicles leaving the rest area should be oriented toward the exit and not confused into using the wrong ramp. Safety roadside rest areas not on freeways must be designed with a public road connection. If the road will ultimately be a freeway, the design should take the ultimate location of structures and roads into consideration.

Parking areas must be well defined by means of striping and curbs in order to encourage orderly and proper parking, for safety and efficiency. The curb angle points should be rounded. Large, paved areas should be relieved by incorporating planting islands, which also help define the circulation pattern. A curvilinear parking area is more pleasing than a long, straight parking lot, and is easier to use. Design plans should show pavement profiles, cross sections and spot grades, indicating both existing and proposed elevations.

All roads and parking areas should be designed to control vehicle traffic by the use of curbs or other barriers. The following comments relate to barriers:

- (a) Service vehicles must be allowed access into the pedestrian area through rolled curb or a removable barrier.
- (b) It is most desirable to have only one type of barrier throughout a development.
- (c) Individuals with disabilities must be afforded easy access into the rest area without need to negotiate wheelchair or crutches over a curb. Rest areas shall be barrier free and accessible to all travelers. Accessibility means reasonable access to all rest area facilities such as parking, picnic tables, walkways, comfort stations, and historical or informational displays.
- (d) Indiscriminate parking should be discouraged through the strategic placement of curbs and barriers.

The basic lengths and widths for parking spaces are as follows. For disabled accessible parking requirements, see Standard Plan A90.

	Length (m)	Width (m)
Auto	6	3
Trucks	21	4.5

Road widths at entrances and exits from parking spaces depend upon the parking angle and vehicle. Reference is made to the booklet, "A Guide to Safety Rest Areas for the National System of Interstate Highways," published by AASHTO. Truck turns should be used to verify road widths at entrances and exits from parking spaces. The minimum width for two-way roads is 9.6 m. See Index 608.7(1) for the design of roadside rest pavements.

- (4) *Comfort Facilities.* The architect in the OSD will consult with the District Landscape Architect in regard to the design concept type and size of comfort station, and will perform the architectural design work. Buildings are to be well lighted, both interior and exterior. Comfort stations will be provided with flush-type toilet fixtures and a sewage disposal system.

The size of comfort stations will be determined by providing fixtures for each sex based upon parking capacity. For men, at least one-half of the total fixtures should be urinals. Lavatories should be provided on the basis of one per each two toilet fixtures. The DES-SD will determine the exact facilities to be provided. A minimum of 4 toilet fixtures including one that is accessible for persons with disabilities for each sex must be provided. Diaper changing tables should be provided in each comfort station.

Maintenance forces must be provided a storage and utility area sufficient in size for equipment and supplies needed to maintain the rest area. A crew room with personal lockers and a Manager's office should also be provided.

A dedicated lockable office and water closet should be provided for use by the California Highway Patrol (CHP). A designated CHP parking space with sign should be provided.

Drinking fountains with chilled water should be provided in conjunction with the comfort station. Drinking fountains without chilled

water may be provided elsewhere in the rest area.

Heated-air drying units should be provided for the drying of hands. A heating system should be installed to eliminate freezing damage to plumbing and provide minimum human comfort levels where appropriate.

Comfort stations should be located within 100 m of any parking space.

- (5) *Water Supply.* Water systems will be designed to be adequate in quantity and quality for the projected use. The water supply system must be designed to handle the peak flow required to furnish water to fixtures in the comfort stations, plus the water necessary to irrigate the landscaped areas. A source of potable water must be one of the first considerations when selecting a site. Where there is no commercial source of water (nearby water district, city, etc.), then a source must be developed. The DES-SD will make all the necessary arrangements with the DES-GS to drill a test hole (or holes) on the proposed site upon notification. They will drill the hole and furnish a complete log of the test hole including electric log. It can then be determined if there is adequate water available, at what levels it is available, and what quality to expect. This information is absolutely necessary not only for the design of the water supply system, but to receive certification and site approval from the FHWA. If it is determined that sufficient ground water is not available, alternate sources must be investigated and established.

- (6) *Sewage Facilities.* Sewage facilities must be designed to handle the peak sewage demand. A method of disposal of wastewater is one of the first priorities when selecting a site. Where there is no means for on-site disposal, then a new site should be found.

Waterborne sewage disposal systems will be included as part of all new or upgraded Rest Area projects; however, where rest areas are needed and no water is available, appropriate alternative technology may be utilized.

The DES-SD will make all necessary arrangements with the DES-GS or District Materials Laboratory to conduct soil analysis and percolation tests. After completion of the testing, approval of the proposed sewage treatment system by the Regional Water Quality Control Board is obtained by the DES-SD. This information and recommendation by the DES-SD is absolutely necessary for the design of the system.

Recreation vehicle sanitary stations (dump facilities) may be provided at rest areas. The site being considered must be able to provide for on-site or municipal disposal.

- (7) *Telephones.* At least 3 public telephones, one of which is a text-telephone and one audio-enhanced for the hearing impaired, and one wheelchair accessible, should be provided at each rest area. A telephone within the maintenance storage area will be permitted if necessary to improve maintenance operations. A telephone may be provided for the CHP office.
- (8) *Picnic Tables and Benches.* One table should be provided for each five parking stalls provided. Tables should be near or adjacent to walkways and should be constructed on a concrete pad for ease of maintenance. Pads should be slightly elevated and sloped at 1% for proper drainage. Separate benches with backs should be provided as needed. Provide at least one accessible table near the comfort stations.
- (9) *Walks and Curbs.* Walks should be wide enough to handle pedestrian traffic at peak hours. A 2.4-meter width is considered minimum. Walks should also be wide enough to allow service vehicles to provide maintenance service to comfort stations. Steps should be avoided on walks wherever possible. A minimum width of 3.6 m should be used immediately in front of comfort stations and in front of the row of parked cars where the heaviest pedestrian traffic is concentrated and where overhang of front portion of cars project. Walks will be constructed of concrete with non-skid surface. Locations of walks should allow direct

circulation to all facilities and should be easily understood by the pedestrian. Ease and directness of circulation between parking area, comfort station, and picnic area should generally determine the location of walks. Curved or flowing lines fit most terrain more comfortably than straight walks. Tree wells in walks should be avoided, unless the tree well is at least 3 m in diameter.

(10) *Shelters.* The quantity of shelters is relative to the size of the site and the number of shade trees. Other considerations in providing shelters are climatic conditions and anticipated picnic usage. Orientation of shelters is determined by the prevailing wind, sun, and access from the parking area. Shelter locations should be studied relative to their appearance from the parking area. The DES-SD is responsible for the development of the architectural design and proper orientation. Tree planting is recommended adjacent to shelters for additional shade and aesthetics.

(11) *Lighting.* Rest areas are to be lighted. Location of light standards should be designed to provide an overall light pattern, which considers the total effect of the exterior lights of the comfort station, and any other lighting in the development of the total pattern. Lighting plans are to be prepared by DES-SD.

Use low brightness luminaires except for cut-off luminaires mounted 7.5 m or higher. Coated (diffuse) lamps should be used with all prismatic lenses.

Average illumination should be 5 lx in the zone between the building and the auto parking area and all crosswalks, and 2 to 3 lx elsewhere. Strong shadows should be avoided, particularly along walkways and at the building.

High pressure sodium (HPS) lamps should be specified on new projects for all exterior fixtures except those attached to buildings.

Walkway lights should generally be 3.6 m to 4.2 m high. Truck parking area lights should generally be 7.5 m to 9 m for cut-off

luminaires, 4.5 m to 6 m for other types. Type and color of luminaires and poles should be compatible with the architectural elements and coordinated by the architect in the DES-SD.

Adequate lighting should be included inside the comfort station to provide a reasonably uniform pattern. Illumination should be at least 22 lx everywhere, including the entrance, with 160 lx at the sink. Lights should be controlled by an automatic switch with a manual bypass.

(12) *Trash Receptacles.* Concrete-type trash receptacles of 110 L maximum capacity should be used for rest areas. The following is relative to type and location of these units.

(a) Units should include a disposable plastic liner that can be conveniently lifted by maintenance personnel.

(b) Units should be located near parking areas, comfort stations, and along major walks. One unit should be provided near and for two picnic tables. It is desirable that each unit be accessible to service vehicles, and that each be set on a concrete pad. Total number should equal one-half the number of parking spaces. Consideration should be given to providing facilities for the temporary storage of trash.

An enclosed dumpster storage area should be provided on the site.

(13) *Planting and Irrigation.* The District Landscape Architect will prepare the planting and irrigation plans.

Planting may consist of trees, shrubs, ground covers, or turf lawns. California native plants should be incorporated into the design, taking into account local plant communities and species availability, to the maximum extent feasible. Trees should be planted to provide shade within the various use areas. The size and variety of the trees should be dependent on location, use, cost, and availability.

Planting should be used to screen out objectionable views, provide shade, wind screens, erosion control, to provide a break in large paved areas, and to create a pleasant setting for the entire rest area. Planting should not be used to screen out the rest areas from easy view of the highway. This view should be left reasonably open for ease of policing.

Irrigation systems must be included whenever planting is a part of the project.

- (14) *Information Displays, Department of Rehabilitation Vending Facilities, Agricultural Displays, and Traveler Information Displays.* Structural material, color, and design should relate to, or may be part of, other structures and facilities within the rest area. The DES-SD will be responsible for the architectural design of these features. The District Landscape Architect will be responsible for site review and approval.

The Office of State Landscape Architecture (OSLA) determines the information which should be displayed. Displays should be lighted with a minimum width of 3 m of paving provided in front of the displays for pedestrian circulation. Displays should usually be built into the comfort facility. At least 10 square meters of display space should be provided.

The OSLA is responsible for the development of policies, operating procedures, standards and administration for these types of uses. The OSLA will coordinate their activities including newspaper vending with the Division of Maintenance so that the proposed uses are consistent with the Department's overall plan for safety roadside rest areas.

- (15) *Vending Machines and Public Information Displays.* Designers should be familiar with the provisions of Subchapter 20, Chapter 2 of the California Administrative Code, "Permissible Activity and Use of Safety Roadside Rest Areas and Vista Points In and Along California State Highways". The designer should adequately consider and plan for uses

and facilities that may reasonably be anticipated.

- (16) *Flagpoles.* Flagpoles are not to be included as a feature of rest areas.
- (17) *Fencing.* Generally, fencing should be constructed only for access control, traffic control, or safety purposes. Where fencing is necessary between the highway and the rest area, it should be as unobtrusive as possible and should not exceed 1.2 m in height. Around the perimeter of the rest area development, any fencing required should also be unobtrusive, and of minimum height and design to accomplish the required function. Care must be exercised in determining the type and location of proposed fencing.
- (18) *Signs.* Directional signs for traffic circulation should be included, but only when necessary for control and safety. Standard regulatory and warning signs should be used on entrance and exit ramps. Area identification signs should be provided. Number of signs should be kept at a minimum. Pedestrian signs should relate to other elements within the rest area and be determined by DES-SD.
- (19) *Hose Bibbs (in Valve Boxes).* Hose bibbs should always be provided for ease of maintenance and for cleanup purposes. They should be provided at 30-meter maximum intervals along walkways and within 15 m of each picnic table.
- (20) *Faucets for Drinking Water.* They should be located adjacent to the parking area, each shelter, or near each table area. The valves should be self closing with no hose threads. Sufficient drainage should be provided to prevent ponding of water. Drainage to waste water treatment plant should be considered.
- (21) *Pet Areas.* A conveniently located pet run area or areas should be provided at each facility. Pet areas should be located away from picnic facilities and high-use pedestrian areas, but should be accessible to all, without requiring users to cross turf or dirt. Pet areas should be provided with a suitable surface, normally a granular material, which will not adversely affect wheelchair tires, stick to

shoes or be too abrasive to the pet's feet. Appropriate signs should be provided to direct users to the pet area. Fencing of pet runs is not generally required nor appropriate.

- (22) *Other Activities and Uses.* The Chief Landscape Architect is responsible for the following: coordinating rest area joint development and privatization efforts; and authorizing placement of vending machines in rest areas. Preference is given to vendors operating under the Business Enterprise Program for the Blind administered by the Department of Rehabilitation.

Topic 904 - Vista Point Standards and Guidelines

904.1 General

New vista points should be considered during planning and design of new alignments for inclusion with the highway contract (see Index 109.3). Vista points may also be provided on existing routes. Existing vista points should be periodically inspected for needed restoration or upgrading.

The District Landscape Architect is responsible for approving site selection, concept, and design for all areas to be signed as vista points. The Division of Design is responsible for geometric approval. For approval of standards lower than indicated herein, see Index 82.1. Structural sections and drainage should be designed in accordance with Chapters 600 and 800.

Vista points shall be designed to be accessible to all travelers and conform to the current Americans with Disabilities Act.

904.2 Site Selection

Site selection is based on the following criteria:

- (1) *Quality.* A site should have views and scenery of outstanding merit or beauty. Locations on designated State scenic highways or in areas of historical or environmental significance should be given special emphasis. A site should provide the

best viewing opportunities compared to other potential locations within the vicinity.

- (2) *Compatibility.* A site should be located on State highway right of way or on right of way secured by easement or agreement with another public agency. A site should be obtainable without condemnation. Sites on or adjacent to developed property or property where development is anticipated should be avoided.
- (3) *Accessibility.* A site must be accessible from a State highway or intersecting road. A site must have adequate sight distance for safe access.
- (4) *Accommodation.* A site must be of adequate size to accommodate the necessary features and facilities. However, development of a site shall not detract from the scenic quality of the area. Adequate space should be available for earth mounding and planting to minimize the visual impact of larger facilities. Adequate space for future expansion is desirable.

904.3 Design Features and Facilities

- (1) *Road Connections.* The design of connections to vista points should be in accordance with Index 107.1. **Vista points designed for freeways shall have standard freeway exit and entrance ramps (see Chapter 500).**
- (2) *Parking.* Paved parking areas should be provided. Parking capacity should be based on an analysis of current traffic data. However, at least five vehicle spaces should be provided. Parking should not exceed 0.025 times the DHV or 50 spaces, whichever, is less. Parking stalls should be delineated by striping. Approximately one-quarter to one-third of the spaces should be allocated to larger vehicles (cars with trailers, recreational vehicles, and buses). Geometrics should be such that all types of vehicles entering the vista point can safely negotiate and exit the facility.
- (3) *Pedestrian Areas.* Vista points should provide a safe place where motorists can observe the view from outside their vehicles.

Walkways may be provided within the viewing area. This space must be accessible to the handicapped and inaccessible to vehicles.

- (4) *Interpretive Displays.* An interpretive display should be provided within the pedestrian area of each vista point. The display should be appropriate to the site, both in design and content. Display structures should not overwhelm or dominate the site, and they should be placed at the proper location for viewing the attraction.

Information should pertain to local environmental, ecological, and historical features. It should interpret the features being viewed to inform and educate the public.

Historical plaques, monuments, vicinity maps, and directions to other public facilities are examples of other appropriate informational items.

- (5) *Vending Machines and Public Information Displays.* Designers should be familiar with the provisions of Subchapter 20, Chapter 2 of the California Administrative Code, "Permissible Activity and Use of Safety Roadside Rest Areas and Vista Points In and Along California State Highways". The designer should adequately consider and plan for uses and facilities that may reasonably be anticipated.
- (6) *Sanitary Facilities.* Comfort stations are usually not provided. Exceptions must be approved by the Chief Landscape Architect.
- (7) *Water.* Potable water may be provided at a reasonable cost. Nonpotable water should not be provided in a vista point.
- (8) *Trash Receptacles.* Trash receptacles should be provided in each vista point. As a guide, one receptacle should be provided for every four cars, but a minimum of two receptacles should be provided per vista point. Dumpsters should not be located at a vista point.
- (9) *Signs.* Directional, regulatory, and warning signs must conform to the Traffic Manual.

- (10) *Planting.* Existing vegetation, rock outcroppings, and other natural features should be conserved and highlighted. Removal or pruning of existing plants to frame the view should be held to a minimum and be directed by the District Landscape Architect. Earth mounding and contour grading may be employed to restore and naturalize the site. Planting, including erosion control, should be provided to revegetate graded areas. Plants requiring permanent irrigation should be avoided.

- (11) *Barriers.* Railings, bollards, or other appropriate barriers should be used to protect pedestrians, and discourage entry into sensitive or hazardous areas.

The design of such barriers should be sensitive to pedestrian scale and reflect the scenic character of the site.

- (12) *Other Features.* Benches, telephones, and viewing machines are optional items. Picnic tables are not be included in vista points.

In general, the inclusion of items which do not either facilitate the viewing of the scenic attraction or blend the vista point into its surroundings should be avoided.